UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 6646

CSAH NO. 36

OVER THE

RED RIVER OF THE NORTH

DISTRICT 4 - CLAY COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 44)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure unit inspected at Bridge No. 6646, Pier 1, was in good to satisfactory condition, exhibiting only moderate deterioration along the cold joint at the ledge of the pier shaft. A heavy accumulation of timber debris, consisting of logs up to 2 foot in diameter, was encountered at the upstream end and along both sides of the pier. The embankments on both sides of the channel exhibited heavy erosion, resulting in a 4 foot vertical drop. The channel bottom consisted of firm material which appeared stable with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) A heavy accumulation of timber debris, consisting of logs up to 2 foot in diameter, was observed at the upstream end of the pier extending from the channel bottom to 6 feet above the waterline and 20 feet into the adjoining spans. A moderate accumulation of timber debris was also observed along both faces of the pier and extended from the channel bottom to the waterline.

(B) The steel icebreaker angle mounted to the upstream nose exhibited moderate corrosion, 1/2 inch diameter rust nodules, and pitting with a maximum penetration of 1/4 inch.

(C) The cold joint at the top of the ledge in the pier shaft exhibited areas of section loss at the upstream and downstream noses up to 3 inches high with up to 1.5 inches of penetration. An additional area of section loss at the upstream end of the pier extended 6 inches above and 6 inches below the ledge with up to 6 inches of penetration but no reinforcing steel was exposed.

(D) Both embankments were heavily eroded upstream and downstream of the structure with a typical vertical drop off of 4 feet to the waterline. In addition, the concrete erosion mat has failed along the last 200 feet of the drainage ditch upstream of the structure.

RECOMMENDATIONS:

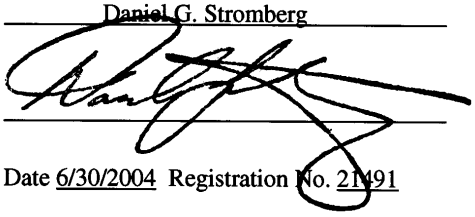
(A) Monitor river embankment erosion during future biennial inspections. Investigate flow and erosion conditions around the bridge and through the upstream ditch and address the erosion protection needs for site specific conditions.

(B) Remove the heavy accumulation of timber debris from the upstream end and along the sides of Pier 1 to alleviate further accumulations and scour problems.

(C) Reinspect the submerged substructure unit at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

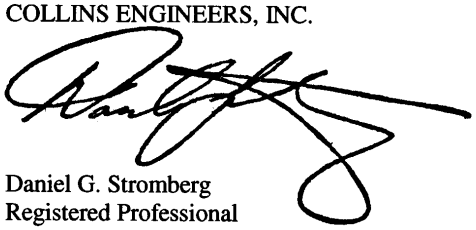
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 6646

Feature Crossed: The Red River of the North

Feature Carried: CSAH No. 36

Location: District 4 - Clay County

Bridge Description: The bridge is a multiple span structure consisting of two modified curved-chord Pratt truss spans with a steel grid deck, and a multiple steel girder superstructure supporting a reinforced concrete deck. The superstructure is supported by reinforced concrete abutments and one reinforced concrete pier. The main span pier within the waterway is founded on untreated timber piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: October 28, 2002

Weather Conditions: Cloudy, "35EF

Underwater Visibility: Negligible/None

Waterway Velocity: "2 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Pier 1

General Shape: The pier consists of two octagonal-shaped reinforced concrete columns connected continuously with a concrete web wall and rest on a rectangular concrete footing which is founded on untreated timber piles. The upstream column has a pointed end with an integral steel icebreaker angle.

Maximum Water Depth at Substructure Inspected: Approximately 5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the north end of Pier 1.

Water Surface: The waterline was approximately 31.8 feet below reference.
Waterline Elevation = 867.0.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

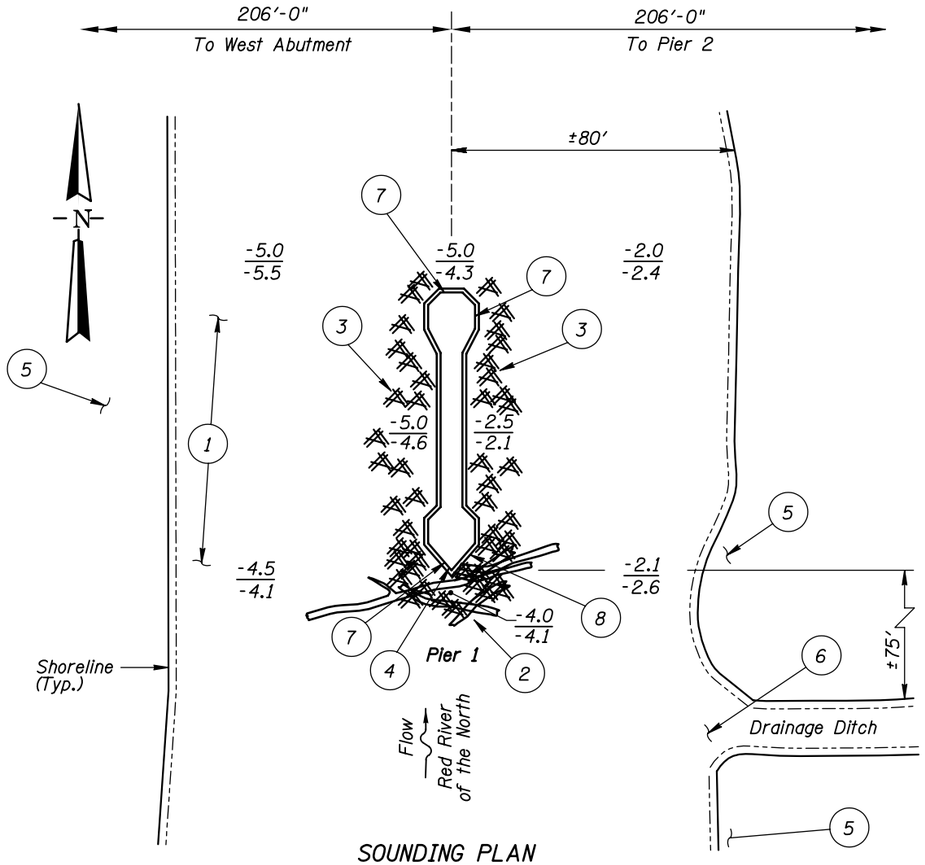
Item 61: Channel and Channel Protection: Code 4

Item 92B: Underwater Inspection: Code B/10/02

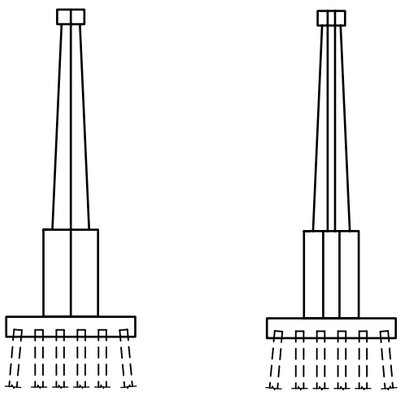
Item 113: Scour Critical Bridges: Code I/91

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____Yes __X__ No



SOUNDING PLAN



TYPICAL END VIEW OF PIER 1

GENERAL NOTES:

1. Pier 1 was inspected underwater.
2. At the time of inspection on October 28, 2002, the waterline was located approximately 31.8 feet below the top of the pier cap at the downstream end of Pier 1. This corresponds with a waterline elevation of 867.0 based on the previous report dated September 9, 1997.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom consisted of gravel with 2 inch diameter cobbles with up to 6 inches of probe rod penetration.

(2) A heavy accumulation of timber debris, consisting of logs up to 2 feet in diameter, was observed at the upstream end of the pier extending from the channel bottom to 6 feet above the waterline and 20 feet into the adjoining spans.

(3) A moderate accumulation of timber debris was observed along both faces of the pier and extended from the channel bottom to the waterline.

(4) The steel icebreaker angle exhibited 1/2-inch-diameter rust nodules with moderate pitting up to 1/4 inch deep.

(5) Both embankments exhibited heavy erosion upstream and downstream of the structure with a 4 foot vertical cut.

(6) The concrete erosion mat has failed along the last 200 feet of the drainage ditch.

(7) The cold joint at the top of the ledge in the pier shaft exhibited areas of section loss at the upstream and downstream noses up to 3 inches high with up to 1.5 inches of penetration.

(8) An area of section loss extended 6 inches above and 6 inches below the ledge at the upstream end of the pier with up to 6 inches of penetration but no reinforcing was observed.

Legend

-2.0 Sounding Depth from Waterline (10/28/02)
-5.2 Sounding Depth from Waterline (9/9/97)

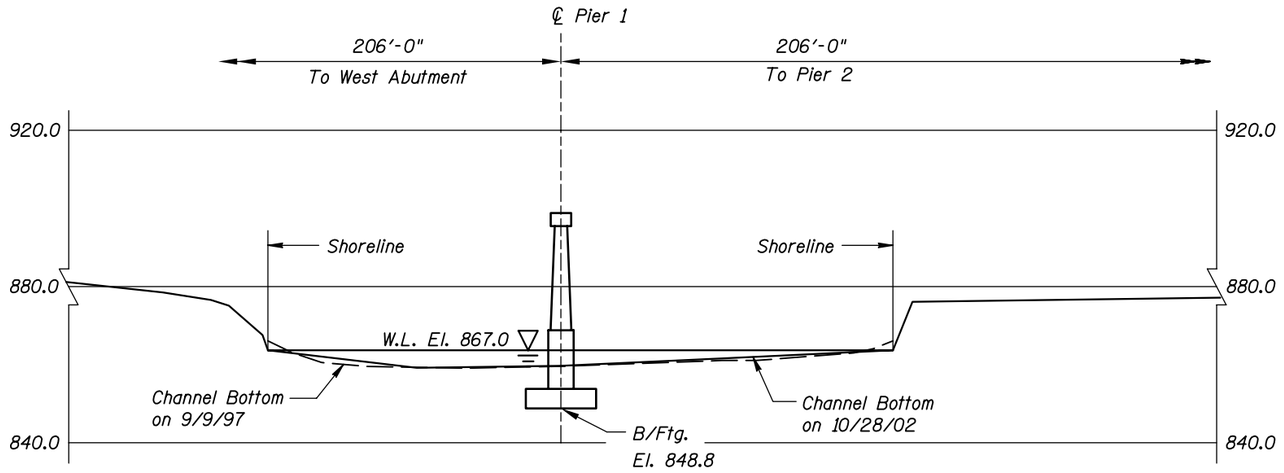
Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

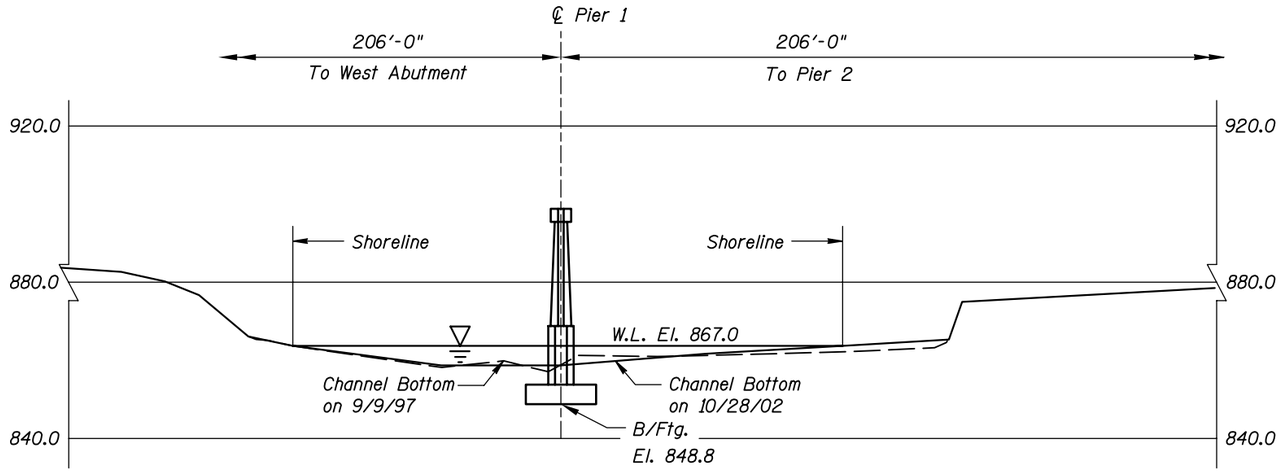
STRUCTURE NO. 6646
OVER THE RED RIVER OF THE NORTH
DISTRICT 4, CLAY COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120044		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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DISTRICT 4, CLAY COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=40'
Code: 35120044		Figure No.: 2

Photograph 1. View of Pier 1, Looking Northwest.

Photograph 2. View of Timber Debris and Drainage Ditch, Looking East.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 28, 2002
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.
BRIDGE NO: 6646 WEATHER: Cloudy, "35EF
WATERWAY CROSSED: The Red River of the North
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins
EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera
TIME IN WATER: 2:00 P.M.
TIME OUT OF WATER: 2:40 P.M.
WATERWAY DATA: VELOCITY "2 f.p.s.
VISIBILITY Negligible/None
DEPTH 5 feet maximum at Pier 1
ELEMENTS INSPECTED: Pier 1
REMARKS: Overall, the concrete of the pier was in good condition with no structurally significant defects observed. A heavy accumulation of timber debris, consisting of logs up to 2 foot in diameter, was observed at the upstream end and along both faces of Pier 1. Several areas of section loss were observed along the cold joint above the ledge which was 1.5 feet above the waterline. The steel icebreaker angle mounted to the upstream nose was moderately corroded and pitted. Both of the upstream and downstream channel embankments were heavily eroded with a 4 foot vertical drop. A concrete erosion mat, which lined a drainage ditch upstream of the structure, has failed along the last 200 feet.

FURTHER ACTION NEEDED: X YES _____ NO

Monitor river embankment erosion during future biennial inspections. Investigate flow and erosion conditions around the bridge and through the upstream ditch and address the erosion protection needs for site specific conditions.

FURTHER ACTION NEEDED (CONTINUED)

Remove the heavy accumulation of timber debris from the upstream end and along the sides of Pier 1 to alleviate further accumulations and scour problems.

Reinspect the submerged substructure unit at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 6646
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Red River of the North

INSPECTION DATE October 28, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (ICEBREAKERS)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	5.0	N	7	N	9	7	7	7	5	5	4	4	7	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the pier was in good condition with no structurally significant defects observed. A heavy accumulation of timber debris, consisting of logs up to 2 foot in diameter, was observed at the upstream end and along both faces of Pier 1. Several areas of section loss were observed along the cold joint above the ledge which was 1.5 feet above the waterline. The steel icebreaker angle mounted to the upstream nose was moderately corroded and pitted. Both of the upstream and downstream channel embankments were heavily eroded with a 4 foot vertical drop. A concrete erosion mat, which lined a drainage ditch upstream of the structure, has failed along the last 200 feet.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.